

# Data Manipulation

## Rotation and Shift

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# Rotation and Shift

## **ALU**

- ✓ Moving bits within the register (right or left)
- ✓ Example:

# Rotation and Shift

## **Circular Shift/Rotation**

- ✓ Consider a byte 10010101
- ✓ One bit right, and rightmost should be put at the hole created on the left side.

# Rotation and Shift

## Logical Shift

- ✓ Consider a byte 10010101
- ✓ One bit right, and rightmost should be discarded and on left side we put Zero.

# Rotation and Shift

## Logical Shift

- ✓ On left side for 2's complement notation multiplying the value
- ✓ As decimal values are multiplied by 10 when shifted.
- ✓ We should take care of sign bit – such shifts sometimes are called Arithmetic Shifts.

# Summary

## **Rotation and Shifting**

- ✓ Left/right rotation and shifting
- ✓ Multiplication and division
- ✓ Arithmetic Shifts.